ATTACHMENT #8

Meritor Maintenance Manual MM-99108 For D-LISA "Air Actuated Disc Brake"

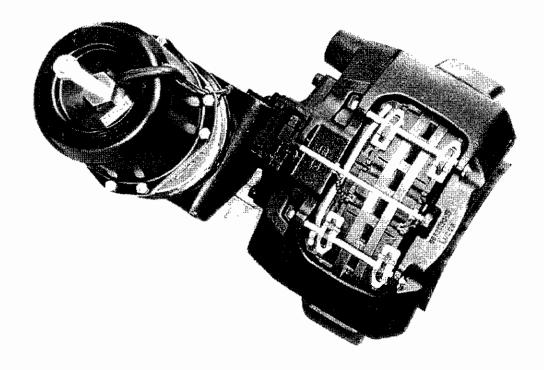
(30 pages)





Air-Actuated Disc Brake

Maintenance Manual MM-99108



D-LISA



Before You Begin

This manual provides installation and maintenance procedures for Meritor's air-actuated disc brake (D-LISA). Before you begin procedures:

- Read and understand all instructions and procedures before you begin to service components.
- Read and observe all Caution and Warning safety alerts that precede instructions or procedures you will perform. These alerts help to avoid damage to components, serious personal injury, or both.
- Follow your company's maintenance and service, installation, and diagnostics guidelines.
- Use special tools when required to help avoid serious personal injury and damage to components.

Safety Alerts, Torque Symbol and Notes

A WARNING	A Warning alerts you to an instruction or procedure that you must follow exactly to avoid serious personal injury and damage to components.
A CAUTION	A Caution alerts you to an instruction or procedure that you must follow exactly to avoid damage to components and possible serious injury.
0	A torque symbol alerts you to tighten fasteners to a specified torque value.
NOTE	A Note provides information or suggestions that help you correctly service a component.

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Asbestos and Non-Asbestos Fibers





ASBESTOS FIBERS WARNING

The following procedures for servicing brakes are recommended to reduce exposure to asbestos fiber dust, a cancer and lung disease hazard. Material Safety Data Sheets are available from Meritor.

Hazard Summary

Because some brake linings contain asbestos, workers who service brakes must understand the potential hazards of asbestos and precautions for reducing risks. Exposure to airborne asbestos dust can cause serious and possibly fatal diseases, including asbestosis (a chronic lung disease) and cancer, principally lung cancer and mesothelioma (a cancer of the lining of the chest or abdominal cavities). Some studies show that the risk of lung cancer among persons who smoke and who are exposed to asbestos is much greater than the risk for non-smokers. Symptoms of these diseases may not become apparent for 15, 20 or more years after the first exposure to asbestos.

Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Specific recommended work practices for reducing exposure to asbestos dust follow. Consult your employer for more details.

Recommended Work Practices

1. <u>Separate Work Areas</u>. Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons. OSHA has set a maximum allowable level of exposure for asbestos of 0.1 f/cc as an 8-hour time-weighted average and 1.0 f/cc averaged over a 30-minute period. Scientists disagree, however, to what extent adherence to the maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling asbestos dust. OSHA requires that the following sign be posted at the entrance to areas where exposures exceed either of the maximum allowable levels:

DANGER: ASBESTOS CANCER AND LUNG DISEASE HAZARD AUTHORIZED PERSONNEL ONLY RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA.

- <u>Respiratory Protection</u>. Wear a respirator equipped with a high-efficiency (HEPA) filter approved by NIOSH or MSHA for use with asbestos at all times when servicing brakes, beginning with the removal of the wheels.
- 3. Procedures for Servicing Brakes
- a. Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake page.
- b. As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based datergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to flow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
- c. If an enclosed vacuum system or brake washing equipment is not available, employers may adopt their own written procedures for servicing brakes, provided that the exposure levels associated with the employer's procedures do not exceed the levels associated with the enclosed vacuum system or brake washing equipment. Consult OSHA regulations for more details.
- d. Wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA for use with asbestos when grinding or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA filter.
- NEVER use compressed air by itself, dry brushing, or a vacuum not equipped with a
 HEPA filter when cleaning brake parts or assemblies. NEVER use carcinogenic
 solvents, flammable solvents, or solvents that can damage brake components as
 wetting agents.
- 4. <u>Cleaning Work Areas</u>. Clean work areas with a vacuum equipped with a HEPA filter or by wet wiping. **REVER** use compressed air or dry sweeping to clean work areas. When you empty vacuum cleaners and handle used rags, wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA for use with asbestos. When you replace a HEPA filter, wet the filter with a fine mist of water and dispose of the used filter with care.
- 5. Worker Clean-Up. After servicing brakes, wash your hands before you eat, drink or smoke. Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA filter to vacuum work clothes after they are worn. Launder them separately. Do not shake or use compressed air to remove dust from work clothes.
- Waste Disposal. Dispose of discarded linings, used rags, cloths and HEPA filters
 with care, such as in sealed plastic bags. Consult applicable EPA, state and local
 regulations on waste disposal.

Regulatory Guidance

References to OSHA, NIOSH, MSHA, and EPA, which are regulatory agencies in the United States, are made to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.



NON-ASBESTOS FIBERS WARNING

The following procedures for servicing brakes are recommended to reduce exposure to non-asbestos fiber dust, a cancer and lung disease hazard. Material Safety Data Sheets are available from Meritor.

Hazard Summary

Most recently manufactured brake linings do not contain asbestos fibers. These brake linings may contain one or more of a variety of ingredients, including glass fibers, mineral wool, aramid fibers, ceramic fibers and silica that can present health risks if inhaled. Scientists disagree on the extent of the risks from exposure to these substances. Nonetheless, exposure to silica dust can cause silicosis, a non-cancerous lung disease. Silicosis gradually reduces lung capacity and efficiency and can result in serious breathing difficulty. Some scientists believe other types of non-asbestos fibers, when inhaled, can cause similar diseases of the lung. In addition, silica dust and ceramic fiber dust are known to the State of California to cause lung cancer. U.S. and international agencies have also determined that dust from mineral wool, ceramic fibers and silica are potential causes of cancer.

Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Specific recommended work practices for reducing exposure to non-asbestos dust follow. Consult your employer for more details.

Recommended Work Practices

- Separate Work Areas. Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons.
- 2. Respiratory Protection. OSHA has set a maximum allowable level of exposure for silica of 0.1 mg/m² as an 8-hour time-weighted average. Some manufacturers of non-asbestos brake linings recommend that exposures to other ingredients found in non-asbestos brake linings be kept below 1.0 f/cc as an 8-hour time-weighted average. Scientists disagree, however, to what extent adherence to these maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling non-asbestos dust.

Therefore, wear respiratory protection at all times during brake servicing, beginning with the removal of the wheels. Wear a respirator equipped with a high-efficiency (HEPA) filter approved by NIOSH or MSHA, if the exposure levels may exceed OSHA or manufacturers' recommended maximum levels. Even when exposures are expected to be within the maximum allowable levels, wearing such a respirator at all times during brake servicing will help minimize exposure.

- Procedures for Servicing Brakes.
- a. Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake parts.
- b. As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to flow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
- c. If an enclosed vacuum system or brake washing equipment is not available, carefully clean the brake parts in the open air. Wet the parts with a solution applied with a pump-spray bottle that creates a fine mist. Use a solution containing water, and, if available, a biodegradable, non-phosphate, water-based detergent. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
- d. Wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA when grinding or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA filter.
- NEVER use compressed air by itself, dry brushing, or a vacuum not equipped with a HEPA filter when cleaning brake parts or assemblies. NEVER use carcinogenic solvents, flammable solvents, or solvents that can damage brake components as wetting agents.
- 4. Cleaning Work Areas. Clean work areas with a vacuum equipped with a HEPA filter or by wet wiping. **NEVER** use compressed air or dry sweeping to clean work areas. When you empty vacuum cleaners and handle used rags, wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA, to minimize exposure. When you replace a HEPA filter, wet the filter with a fine mist of water and dispose of the used filter with care.
- 5. Worker Clean-Up. After servicing brakes, wash your hands before you eat, drink or smoke. Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA filter to vacuum work clothes after they are worn. Launder them separately. Do not shake or use compressed air to remove dust from work clothes.
- 6. Waste Disposal. Dispose of discarded linings, used rags, cloths and HEPA filters with care, such as in sealed plastic bags. Consult applicable EPA, state and local regulations on waste disposal.

Regulatory Guidance

References to USHA, NIOSH, MSHA, and EPA, which are regulatory agencies in the United States, are made to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.

Section 2 Introduction



Overview

This manual provides maintenance and service information for Meritor's reaction beam caliper disc brake assembly that is air-actuated with a load insensitive side adjuster (LISA).

Product Features

The brake assemblies are mounted at the axle ends, and you change brake pads without removing the caliper. The calipers are right- and left-handed and are identical except for the chamber mounting brackets.

Components

Non-Asbestos Brake Lining Assemblies

Each brake caliper requires two non-asbestos bonded brake lining assemblies. The assemblies are located on the inner and outer rotor surfaces and are supported in the caliper by caliper slide pins. The assemblies transfer brake load directly to the axle.

Torque Plate

The torque plate assembly holds the caliper carrier in position and provides mounting holes for carrier and axle attached bolts.

Carrier

The carrier is a heavy casting that extends over both sides of the rotor and is mounted to the axle by the torque plate. Fully-enclosed caliper slide pins position the caliper, which provides support for the lining assemblies.

Caliper

The disc brake caliper houses the internal actuating components and caliper mechanism and maintains correct brake shoe contact with the carrier. The caliper is supported on two slide pin assemblies that are bolted to the carrier. The assemblies enable the brake shoes to self-align during actuation and allow for brake shoe wear.

Hub and Rotor Assembly

The rotor is mounted onto the hub and allows the inner and outer surfaces to support the brake shoe linings during actuation. All rotors are a nominal 17.25-inches (438 mm) in diameter.





How the Disc Brake Operates

The air chamber is attached to a chamber bracket, which is mounted to the caliper housing and connected by a lever to the caliper operating shaft.

The carrier is secured to the vehicle and extends over the rotor. The caliper housing assembly slides on two fully-seated guide pins bolted to the carrier. **Figure 3.1**.

The brake pads are supported on the carrier and retained by pad retaining springs. Braking forces generated by the brake pads transmit directly to the carrier. As the pads wear, an automatic adjusting mechanism adjusts the brakes.

The adjustment maintains the correct lining-to-disc clearance, which prevents over- or under-adjustment for vehicles with different duty cycles.

Brake Application (No Adjustment Required)

- The mechanically-driven actuator incorporates an operating shaft, three hardened balls, and a ramp and tappet arrangement.
- The adjuster mechanism is located at the side of the operating shaft/ramp assembly and consists of a multi-plate friction clutch and a wrap-spring clutch. Figure 3.1.
- The multi-plate spring-loaded clutch slips at a controlled torque in either direction. The wrap-spring clutch locks in one direction and is free to slip in the opposite direction.
- 4. The air chamber applies a load to the actuating lever, which rotates the operating shaft. The operating shaft rotates the hardened balls, which sit in helical pockets in both the operating shaft and ramp. When the operating shaft rotates the balls, they begin to rise up the helix of the pockets and expand the area between the operating shaft and ramp.
- The anti-rotation pin prevents the ramp from turning, which moves the ramp AWAY from the operating shaft in a linear direction.
- The adjuster nut threads to the tappet transmit clamp force. The tappet transmits the load to the spreader plate, which distributes it evenly across the brake pad. The load forces the inner brake pad against the rotor.

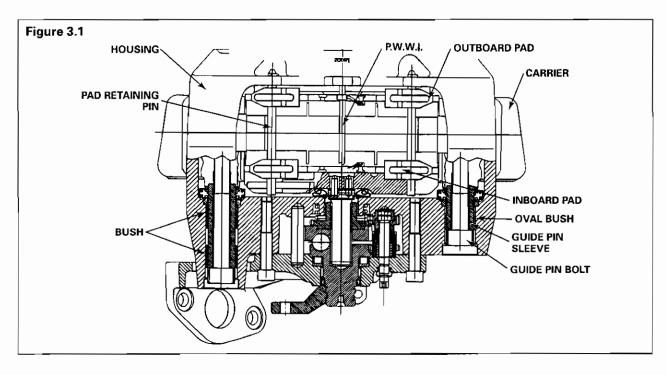
- 7. A reaction force transmits through the thrust bearing, thrust washer, cover plate and cover plate bolts, and presses the outer pad against the rotor. When the outer gears on the shaft and adjuster engage, the rotating operating shaft turns the automatic adjuster's slotted wheel.
- 8. The internal wrap spring locks and becomes a solid link that eliminates free play between the wheel and the multi-plate friction clutch. The free play is the pad-to-rotor running clearance in the "brakes off" position. The multi-plate friction clutch attempts to transmit torque from the slotted wheel to the adjuster wheel, and then to the tappet adjuster nut.
- Further rotation of the operating shaft increases clamp load when the pads contact the rotor.
 Torque between the tappet and adjuster nut increases to a level higher than adjuster assembly friction clutch torque. The friction clutch slips and prevents brake adjustment.
- 10. When you release the brake, the main return spring and air chamber spring force the operating mechanism into the "brake off" position. The adjuster wrap spring slips and prevents deadjustment during release.

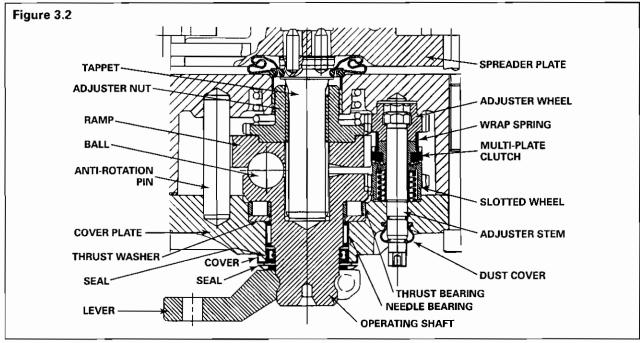
Brake Application (Adjustment Required)

- The actuator operates the same for brake applications with "no adjustment required." The adjuster's slotted wheel eliminates the free play between the adjuster and the clutch plate tangs. Figure 3.2.
- Pad and rotor clearance is greater than the preset running clearance, so no load is generated to cause the clutch to slip. As a result, the clutch becomes a solid link that rotates the adjuster wheel.
- The wheel rotates the tappet adjuster nut that extends length of the tappet screw, which reduces pad-to-rotor clearance.
- Once the pads contact the rotor, further rotation of the operating shaft increases the clamp load between the pad and rotor. This causes the friction clutch to slip.
- The adjuster stops operating, which prevents over adjustment. When you release the brakes, clamp load on the pads is removed.







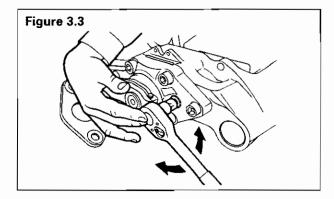




- The operating shaft turns in the OFF direction and uses slotted wheel free play to rotate the wheel, until the friction clutch plate tangs contact the side of the slot.
- The operating shaft continues to turn in the OFF direction to rotate the slotted wheel and the friction clutch assembly. However, movement is not transferred to the adjuster nut, because the wrap spring clutch slips.
- 8. The tappet remains in the adjusted position, and correct running clearance is maintained.

Manual Adjustment

The brake adjuster assembly has a manual override that enables you to manually adjust or deadjust the brake to install new shoes. **Figure 3.3**.



To Manually Adjust or Deadjust the Brakes

- Place a 10 mm socket wrench on the adjuster stem.
- Press the stem until it engages the adjuster wheel. Continue to press the stem after it engages in the wheel.
- 3. Use the wrench to turn the adjuster stem to adjust or deadjust the brakes as follows:
 - To adjust the brake: Turn the adjuster stem COUNTERCLOCKWISE.
 - To deadjust the brake: Turn the adjuster stem CLOCKWISE.

Section 4 Disassembly



Before You Remove Components



WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

- 1. The vehicle must be on a level surface.
- Put blocks under the wheels that will not be raised to keep the vehicle from moving.
- Raise the vehicle, so that he area you sill service is off of the ground. Support the vehicle with safety stands.



WARNING

When you work on a spring chamber, carefully follow the service instructions of the chamber manufacturer. Sudden release of a compressed spring can cause serious personal injury.

- Carefully cage and lock the spring, so that the spring cannot actuate during assembly.
- Follow the wheel manufacturer's instructions to remove the wheels. Exhaust all air from the system.

Remove Components

Brake Pad Replacement (On Vehicle)



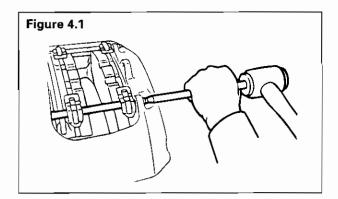
ASBESTOS AND NON-ASBESTOS FIBERS WARNING

Some brake linings contain asbestos fibers, a cancer and lung disease hazard. Some brake linings contain non-asbestos fibers, whose long-term effects to health are unknown. You must use caution when you handle both asbestos and non-asbestos materials. Refer to page i in this manual for hazard summaries and recommended work practices.

 Use a wire brush to remove dirt from the caliper assembly. Ensure that you do not damage the rubber dust covers.

NOTE: The retaining pins hold the spreader spring in tension on the spreader plate.

 Remove the brake pad retaining clips. Use a hammer and drift to tap out the retaining pins.
 Figure 4.1. Hold the spreader spring in position to prevent it from releasing from the brake.





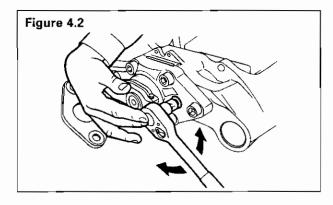


CAUTION

When you manually adjust brakes for clearance, do not exceed a maximum torque of 11 lb-ft (15 N·m) in either direction. Use a socket wrench on the adjuster stem. Do not use air or electric power tools. Damage to components can result.

NOTE: It may be necessary to initially deadjust the brakes to remove worn brake pads.

3. Place a 10 mm socket wrench on the adjuster stem. Press the stem until it engages the adjuster wheel. Continue to press the stem and rotate the wrench in the same direction as lever travel (brake application stroke). Figure 4.2.



NOTE: If necessary, use hand pressure to retain the spreader plate on the tappet head. If the tappet pins do not engage with the spreader plate. further deadjustment will not occur.



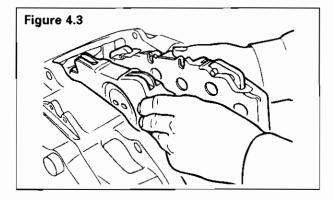
CAUTION

When you manually adjust brakes for clearance, do not exceed a maximum torque of 11 lb-ft (15 N·m) in either direction. Use a socket wrench on the adjuster stem. Do not use air or electric power tools. Damage to components can result.

4. Deadiust the brake until you can remove the OUTBOARD pad.

NOTE: Do not install the new OUTBOARD pad at this point.

- 5. Remove the OUTBOARD pad.
- 6. Remove the INBOARD pad and spreader plate. Figure 4.3.



Inspection

Refer to Section 8.

Caliper Overhaul (Off Vehicle)



WARNING

When you remove a clevis pin that has a spring, hold the spring with pliers. The spring can disengage from the clevis pin with enough force to cause serious personal injury and damage to components.

- 1. Remove the clevis pin that secures the air chamber clevis to the actuating lever.
- 2. Remove the air chamber from the air chamber mounting bracket.
- 3. For brake pad removal, refer to "Brake Pad Replacement (On Vehicle)" in this section.
- Support the caliper assembly. Remove the caliper-to-torque plate retaining bolts.



Section 4 Disassembly

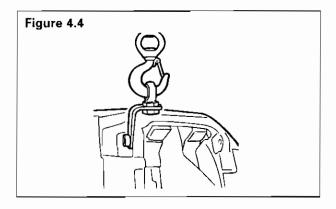




WARNING

When you use a bracket and eye bolt to lift the caliper assembly from the axle, take care that you do not trap your fingers between the caliper housing and the carrier bracket. Serious personal injury can result.

 Use suitable lifting equipment, such as a bracket and eye bolt, to safely lift the caliper assembly VERTICALLY from the axle.
 Figure 4.4.



Caliper Housing

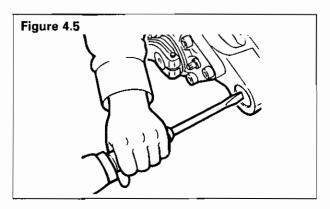
Move the caliper assembly to a suitable workbench.



CAUTION

Only use new guide pin caps when you assemble the carrier housing. Discard used caps, which can cause damage to components.

 Use a hammer and drift to remove the guide pin caps. Figure 4.5. Discard the caps. Only use new guide pin caps when you reassemble the caliper housing.



- 3. Loosen the guide pin bolts.
- Support the weight of the caliper housing assembly. Remove and discard the guide pin bolts. Carefully lift the caliper housing assembly from the saddle or carrier.
- Remove the guide pin sleeves from the caliper housing.
- Use solvent cleaner or an acceptable brake cleaner to clean the guide sleeves.
- Inspect the carrier for wear or damage, especially the pad abutment areas and guide sleeve locations. Replace a damaged or worn saddle or carrier.
- Clean and inspect the brake rotor. Check the rotor for grooves, cracks, heat checks, scoring and bluing. Refer to Section 5.
- Check the rotor's thickness dimension. The specification is cast in the rotor, or 1.61-inches (41 mm), whichever is larger.
 - If the rotor's thickness dimension is not high enough to permit expected wear before the next brake pad replacement: Replace the rotor.



Tappet and Dust Cover Retainer Inspection

Tappet



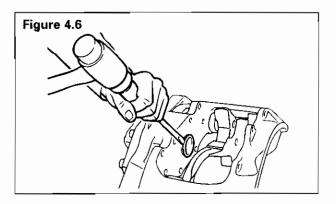
WARNING

Solvent cleaners can be flammable, poisonous and cause burns. Examples of solvent cleaners are carbon tetrachloride, emulsion-type cleaners and petroleum-based cleaners. To avoid serious personal injury when you use solvent cleaners, you must carefully follow the manufacturer's instructions and these procedures:

- · Wear safe eye protection.
- · Wear clothing that protects your skin.
- · Work in a well-ventilated area.
- Do not use gasoline or solvents that contain gasoline. Gasoline can explode.
- You must use hot solution tanks or alkaline solutions correctly. Follow the manufacturer's instructions carefully.
- Use a solvent cleaner or an acceptable brake cleaner to thoroughly clean the tappet dust cover area.
- 2. Remove and discard the dust cover.
- Inspect the tappet and dust cover location on the housing for damage and wear. Replace damaged or worn parts. Refer to "Dust Cover Retainer" in this section.
- Lightly lubricate the internal surface of the new dust cover and the location areas of the tappet screw and housing with the grease provided.

Dust Cover Retainer

- Remove the tappet screw from the carrier housing.
- Clean the dust cover retainer and the area of the housing next to the retainer.
- Inspect the dust cover retainer for damage or wear. Use a hammer and drift to tap the retainer out of the carrier housing. Figure 4.6.



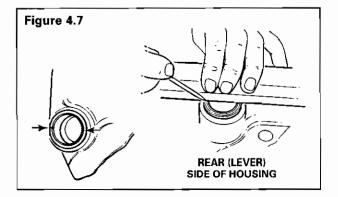
Guide Sleeves and Guide Sleeve Bushings

Guide Sleeves

- Place the housing caliper UPSIDE DOWN to expose the guide sleeve areas.
- Detach the guide sleeve dust covers from the housing. Remove the guide sleeves and dust covers from the housing.

Guide Sleeve Bushings

- Use the following procedures to mark the brass bushings from the short guide sleeve bore:
 - a. Turn the housing so that the operating shaft faces UP. Look into the guide sleeve bore to find the two notches on edges of the bushings.
 - b. Use a rule or straight-edge to connect the two notches. Mark the housing turret where the notches connect. Figure 4.7. Proceed to Steps 2 and 3 on the next page.



Section 4 Disassembly



NOTE: When you remove the guide sleeve brass bushings from the housing, you will also remove the dust cover retainers that are pressed into the guide sleeve bores.

- Use a hammer and drift to tap out the brass bushings from the short guide sleeve bore and the two plastic bushings from the long guide sleeve bore. You will also remove the dust cover retainer at the same time.
- 3. Inspect the bore for damage.

Section 5 **Prepare Parts for Assembly**

Clean, Dry and Inspect Parts



WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Solvent cleaners can be flammable, poisonous and cause burns. Examples of solvent cleaners are carbon tetrachloride, emulsion-type cleaners and petroleum-based cleaners. To avoid serious personal injury when you use solvent cleaners, you must carefully follow the manufacturer's instructions and these procedures:

- · Wear safe eye protection.
- · Wear clothing that protects your skin.
- · Work in a well-ventilated area.
- · Do not use gasoline or solvents that contain gasoline. Gasoline can explode.
- You must use hot solution tanks or alkaline solutions correctly. Carefully follow the manufacturer's instructions.

Parts Cleaning

For Ground or Polished Metal Parts



CAUTION

Do not use hot solution tanks or water and alkaline solutions to clean ground or polished parts. Damage to parts will result.

Use a cleaning solvent or kerosene or diesel fuel to clean ground or polished metal parts or surface.

For Rough Metal Parts

Use a cleaning solvent or a weak alkaline solution in a hot solution tank to clean rough metal parts. If you use a hot solution tank, follow the instructions below.

- 1. Leave the rough parts in the tank until they are completely cleaned and heated.
- Remove the rough parts from the tank.
- 3. Wash the parts with water until you remove the alkaline solution.

Dry and Inspect Parts

- 1. Use soft, clean paper or cloth rags, or compressed air to completely dry parts immediately after you clean them.
- Carefully inspect all parts for wear or damage before you assemble them.
- Repair or replace worn or damaged parts.

Apply Corrosion Protection

- 1. Apply a thin layer of grease to cleaned, dried parts. Be careful that you do not apply the grease to the linings or rotor.
- If you will store the parts, apply a special material, which prevents corrosion and rust, to all surfaces. Store parts inside special paper or other material that prevents rust and corrosion.

Section 6 Assembly



Install Components



WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.



ASBESTOS AND NON-ASBESTOS FIBERS WARNING

Some brake linings contain asbestos fibers, a cancer and lung disease hazard. Some brake linings contain non-asbestos fibers, whose long-term effects to health are unknown. You must use caution when you handle both asbestos and non-asbestos materials. Refer to page i in this manual for hazard summaries and recommended work practices.

A New Caliper

- 1. Carefully remove the guide sleeve dust covers from the new caliper housing.
- Refer to "Guide Pins and Guide Pin Dust Covers" in this section.

Caliper Overhaul (Off Vehicle)

New Bushings

Brass Bushing (Short Guide Sleeve)

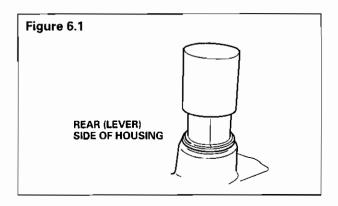
- Use a solvent cleaner or an acceptable brake cleaner to clean the guide sleeve bores.
- Inspect the bore for wear and damage.
 - If the bore is worn or damaged: Replace the carrier housing.

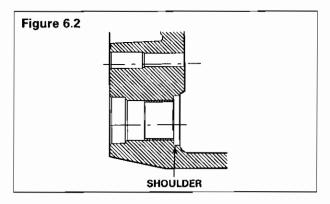


A CAUTION

Install both brass and plastic bushings from the INBOARD (lever side) of the caliper housing. Do not install bushings from the OUTBOARD (tappet side). Damage to components can result.

Place the bushing on the housing. Ensure that the two notches on each edge of the bushing align with the marks on the guide sleeve turret. 4. Use a hammer and drift to tap the bushing into the bore. Figure 6.1. The FRONT edge of the bushing must be flush with the recess in the housing bore. Do not tap the bushing past the recessed shoulder. Figure 6.2.



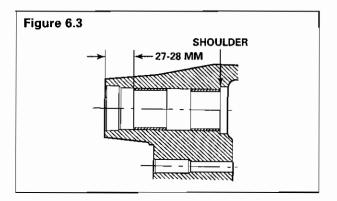


Plastic Bushing (Long Guide Sleeve)

- Use a hammer and drift to tap the first bushing into the caliper housing. The front edge of the bushing must be flush with the recess in the housing bore. Figure 6.3.
- Tap the second plastic bushing into the bore to a depth of 1.00-inch (27-28 mm). Do not tap the bushing past the recessed shoulder. Figure 6.2 and Figure 6.3.







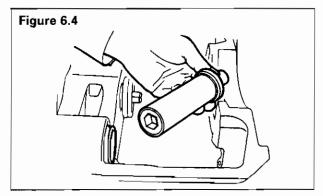
Guide Pins and Guide Pin Dust Covers

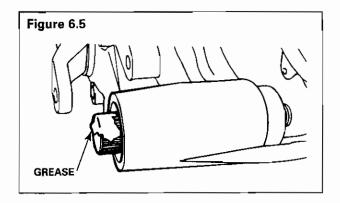
- Use the grease supplied with the service kit or use lubricant specified to lightly lubricate the following parts. Refer to Section 10 for lubricant specifications.
 - · New guide pin sleeves
 - · Dust cover location groove
 - · Dust cover retainers in the housing
 - · Guide pin dust covers
- Install the new dust covers onto the guide sleeves. Ensure that the covers fit correctly in the guide sleeve retainer groove.
- Install the covers onto the guide sleeves. Verify that they are positioned correctly in the guide sleeve retainer groove.
- 4. Apply the same grease to the guide sleeves and housing guide sleeve bores.

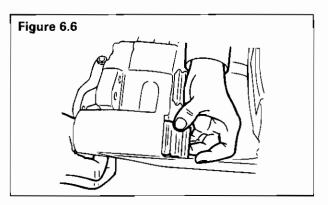
NOTE: Install the guide pin bolts into the guide sleeves before you install the sleeves into the housing to help prevent grease buildup on the guide sleeve and bolt head faces. Grease buildup can affect torque when you tighten the guide pin bolts.

- 5. Install new guide pin bolts into the guide sleeves. Carefully install the guide sleeves into the new caliper housing. **Figure 6.4**.
- 6. Remove the bolts. Wipe off excess grease from the bolt heads. Figure 6.5.
- Reapply grease to the guide sleeve behind the dust cover.

 Install the guide pin boots onto the housing retainers. Gently pull the guide sleeve to verify that it is installed securely. Figure 6.6.



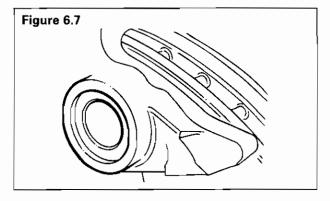




Section 6 Assembly



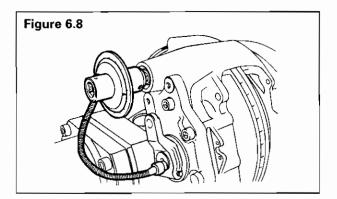
9. Carefully lower the caliper housing assembly into position on the carrier. Verify that the guide sleeves are positioned in the carrier's counter bores. Figure 6.7.



- 10. Install new guide pin bolts. Tighten the bolts to 37 lb-ft (50 N·m).
- 11. Slide the carrier housing BACKWARD and FORWARD several times to check that the housing moves smoothly on the guide pins.

NOTE: Use a torque attachment to tighten the guide pin bolts helps to ensure an accurate and constant bolt clamp load.

- 12. Install a torque angle attachment on the long guide pin bolt. Figure 6.8. Set the angle gauge to ZERO. Tighten the bolt to 127-137 degrees. •
- 13. Install a torque angle attachment on the shorter guide pin bolt. Set the angle gauge to ZERO. Tighten the bolt to 97-107 degrees. The angle minimum must not be less than 97 degrees.

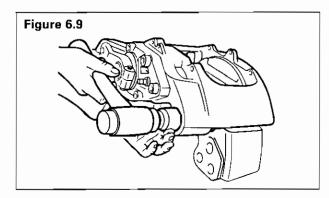




A CAUTION

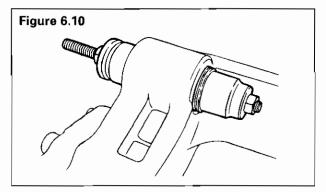
Only use new guide pin caps when you assemble the carrier housing. Discard used caps, which can cause damage to components.

- 14. Check the housing's movement on the guide pins. Refer to Step 11 on this page. Use a copper mallet to tap one of the new guide pin caps into the housing.
- 15. Use the correct-size tool or hexagon socket to tap the guide pin cap into the bore, until the cap stops against the shoulder. Figure 6.9.
- 16. Reassemble the brake. Check the operating lever setting. Refer to "Air Chamber" in Section 7.

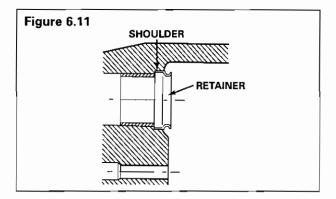


Guide Pin Dust Cover Retainer

- 1. Install a new dust cover retainer into the guide sleeve bore on the tappet side.
- 2. Use a threaded rod and sockets and washers to carefully pull the retainer into position. Figure 6.10. Ensure that the retainer contacts the recessed shoulder in the bore. Figure 6.11.
- 3. Use the procedure in Step 2 above to install the second retainer.





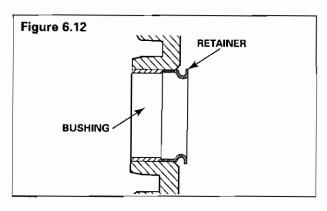


Tappet Dust Cover

- Inspect the exposed areas of the tappet and dust cover on the housing for signs of wear or damage. Replace worn or damaged components.
- Lightly lubricate the internal surface of the new dust cover and the tappet screw and housing. Use O-645, NLGI Grade 2, grease specified by Meritor.
- Carefully install the dust cover over the tappet. Position the dust cover on the housing.
- Position the dust cover into the groove on the head of the tappet. Ensure that the dust cover and tappet are secure.
- Use the same procedure to install the other dust cover.

Tappet Dust Cover Retainer

- Install a new dust cover retainer into the mouth of the housing. Use a hammer and drift to carefully tap the retainer into the housing, until the retainer touches the bushing. Ensure that you do not move the bushing in the housing bore. Figure 6.12.
- Wipe the grease from the adjuster nut. Apply new O-645, NLGI Grade 2, grease specified by Meritor; or use the grease supplied with the components.
- Apply the same grease to the internal threads of the adjuster nut.
- Install the tappet into the adjuster nut. Allow approximately 0.75-inch (20 mm) of the tappet to extend from the nut for easier dust cover installation.
- Use the same procedure to install the other dust cover retainer.



Caliper



CAUTION

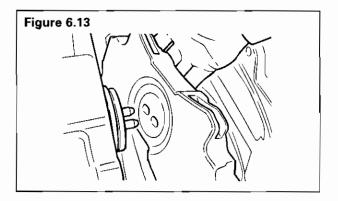
Avoid excessive movement when you lower the caliper assembly into position on the axle mounting flange. Do not drop the caliper assembly into position on the flange. Damage to components can result.

- Use suitable lifting equipment to carefully lower the caliper assembly into position on the axle mounting flange.
- Install new retaining bolts. Tighten the bolts to 345-405 lb-ft (460-540 N•m).

Brake Pad Installation (On Vehicle)

NOTE: Some models of the spreader plate may have one pin and one bolt instead of two pins.

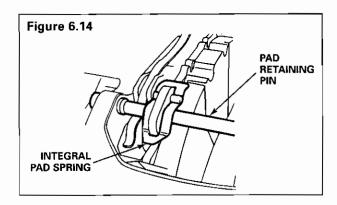
 Reinstall the spreader plate. Verify that the two pins on the tappet head position correctly into the spreader plate. Figure 6.13.



Section 6 Assembly



- Install the new OUTBOARD pad first. Push the housing back TOWARD the rotor, until the new pad contacts the rotor.
- Continue to push the housing. Use light pressure.
- Press the adjuster stem and continue to deadjust the brake, until the opening between the spreader plate and the rotor is large enough to accept the new pad, which is 1-1/8-inches (28.5-29 mm).
- Install the spreader spring onto the spreader plate. Hold the plate in position and tap one of the pad retaining pins from the caliper's INBOARD side.
- Verify that the pad retaining pin positions correctly under the integral pad springs when the pin is fully installed. Figure 6.14.
- Repeat Steps 5 and 6 above for the second pad retaining pin. Secure both pins with new clips.





Brake Pads



WARNING

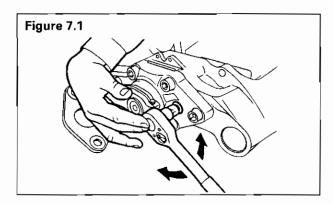
To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.



ASBESTOS AND NON-ASBESTOS FIBERS WARNING

Some brake linings contain asbestos fibers, a cancer and lung disease hazard. Some brake linings contain non-asbestos fibers, whose long-term effects to health are unknown. You must use caution when you handle both asbestos and non-asbestos materials. Refer to page i in this manual for hazard summaries and recommended work practices.

- 1. Place a 10 mm socket wrench on the adjuster stem. Press the stem until it engages in the adjuster wheel. Continue to press the stem after it engages in the wheel.
- 2. Use the wrench to turn the adjuster stem in the OPPOSITE direction of the actuating lever's travel. Continue to adjust the brake until both pads contact the rotor. Figure 7.1.



- 3. Deadjust the brake by pressing and turning the adjuster stem back ONE TURN. Verify that the rotor is free to turn 360 degrees.
- 4. Charge the system with air to 100 psi (689 kPa). Where applicable, uncage the spring brake. Release the parking brake.

NOTE: Apply the service brakes five times at low pressure before you apply the parking brake or return the vehicle to service to ensure that the pads are adjusted correctly.

- 5. Apply the service brake five times at low pressure to ensure that the pads are adjusted correctly. Apply the parking brake.
- 6. Follow the wheel manufacturer's instructions to install the wheels. Remove the jack stands and lower the vehicle.

Disc Brake

NOTE: When you replace an air chamber, the original clevis (MGM 8292017) must be used and the push rod must be cut to the correct length.

- 1. Use this procedure before you adjust the brakes when you replace the brake calipers, rotor or brake chambers.
- Apply 110 psi (689 kPa) of air to fully release the spring brakes and cage the brake chambers (drive and tag axles only).

Brake Chamber Clevis Adjustment

- 1. Remove the push rod clevis pin.
- Measure the distance between the center of the clevis pin hole in the push rod and the air chamber mounting surface (with the push rod in the brake-release position TOWARD the air chamber).

Chamber Push Rod Location

Axle	Measurement/Inches (mm)		
Front and Tag	6.07-6.47 (154.2-164.3)		
Drive	3.31-3.69 (84.1-93.7)		

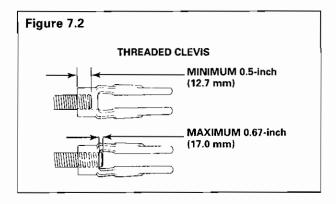
- 3. Measure the distance between the center of the clevis pin hole and the air chamber mounting surface for each brake. The measurement must be 0.06 ± 0.02-inch $(1.4 \pm 0.4 \text{ mm})$ greater than the previous values (one full turn of the clevis).
- 4. Align the push rod hole with the clevis. Install the clevis pin and secure it with a retainer pin.



Section 7 Adjustment



- The table below shows the final adjustment of the clevis to the brake chamber mounting face.
 - Thread engagement between the clevis and the push rod must be at least 0.5-inch (12.7 mm). Figure 7.2.
 - The push rod must not extend through the clevis more than 0.67-inch (17.0 mm).



Clevis to Brake Chamber Mounting-Face Final Location

Axle	Measurement/Inches (mm)		
Front and Tag	6.11-6.54 (155.3-166.1)		
Drive	3.35-3.76 (85.1-95.5)		

Manually Adjust for Clearance

Manually adjust for clearance each time you adjust the clevis and replace the brake pads.



CAUTION

When you manually adjust brakes for clearance, do not exceed a maximum torque of 11 lb-ft (15 N·m) in either direction. Use a socket wrench on the adjuster stem. Do not use air or electric power tools. Damage to components can result.

- Rotate the adjuster to allow the brake pads to contact the rotor. Do not exceed a torque of 11 lb-ft (15 N·m).
- Rotate the adjuster one full turn in the OPPOSITE direction. Verify that the rotor is free to turn 360 degrees.
- Measure the total lining clearance at the center of each brake pad.

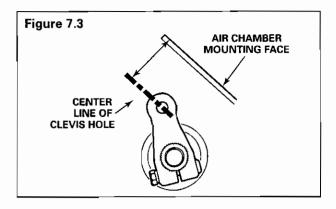
 Slide the caliper and pads to obtain 0.024-0.035-inches (0.6-0.9 mm) clearance between either the caliper and the OUTBOARD pad or the spreader and the INBOARD pad.

Air Chamber

- Check the position of the brake lever in relation to the air chamber mounting bracket.
- Push the lever TOWARD the mounting bracket until you feel resistance.

NOTE: Hold the air chamber mounting face TOWARD the mounting bracket when you measure.

- Measure from the center of the brake lever clevis hole to the air chamber mounting face on the mounting bracket. Figure 7.3. Verify that the measurements are within the correct specifications. Refer to "Disc Brake" in this section.
 - If you need to adjust the brake lever:
 Remove the pinch bolt and the lever.
 Adjust the lever to the correct position.
 Install the pinch bolt and tighten it to
 44-54 lb-ft (60-73 N•m).
- Check the measurement from the center of the air chamber clevis hole to the air chamber mounting face is within specifications.







WARNING

If you replace an air chamber, use the same clevis type as the original. Ensure that you cut the push rod to the correct length. An incorrect installation can cause the brakes to lock. Serious personal injury and damage to components can result.

- Install the air chamber to the mounting bracket. If you are replacing the chamber, you must use the same clevis-type as the original and cut the push rod to the correct length. Refer to "Disc Brake" in this section and Table A in Section 8.
- Check the alignment of the clevis and operating lever clevis hole.
- If necessary, adjust the air chamber clevis to align with the operating lever clevis hole. Turn the clevis an additional ONE FULL turn.



WARNING

Always replace used clevis pin retainer clips with new ones when servicing the automatic slack adjuster or chamber. Do not reuse clevis pin retainer clips after removing them. Discard used clips. When removed for maintenance or service, clevis pin retainer clips can be bent or "gapped apart" and can lose retention. Damage to components can result.

- Install the clevis pin and secure it with a new retainer pin. Tighten the clevis jam nut.
 Tighten the brake chamber bracket nuts to 100-115 lb-ft (135-155 N·m).
- Install the spreader plate and new brake pads. Refer to Section 6.
- 10. Uncage the parking brakes, where applicable. Charge the system with air to 100 psi (689 kPa). Apply the parking brake to remove drag from the air chamber caging bolt.
- Remove the air chamber caging bolt. Apply the service brake five times at low pressure to ensure that the pads are adjusted correctly.
- 12. Apply the parking brake.
- Follow the wheel manufacturer's instructions to install the wheels. Remove the jack stands and lower the vehicle.

Section 8 Maintenance and Inspection



Maintenance Intervals

Minor Inspection

Every 3 Months or 12,500 Miles (20 000 Km)



WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.



ASBESTOS AND NON-ASBESTOS FIBERS WARNING

Some brake linings contain asbestos fibers, a cancer and lung disease hazard. Some brake linings contain non-asbestos fibers, whose long-term effects to health are unknown. You must use caution when you handle both asbestos and non-asbestos materials. Refer to page ì in this manual for hazard summaries and recommended work practices.

- Inspect the brake pads for wear. Replace the pads when the lining has worn to 1/8-inch (3 mm)
- Check brake lever travel. Refer to the table below.
- Inspect the brake assembly for damage or corrosion. If necessary, follow the vehicle manufacturer's instructions to replace the assembly.

Table A

Manufacturer and	Type of Axle	Maximum Readjusted Chamber Stroke with 100 psi (689 kPa) Applied	
Chamber Size		Inches	Millimeters
MGM 16/20 Long Stroke (2.50*)	Tag	2.0	51.0
MGM T24 Long Stroke (3.00")	Front	2.5	63.5
MGM 24/30 Long Stroke (3.00*)	Drive	2.5	63.5

Major Inspection

Every 12 Months

- Follow the wheel manufacturer's instructions to remove the wheels.
- Remove the brake pads. Refer to Section 4. Inspect the pads.
- Check that the caliper slides freely on the guide pins that are secured to the carrier.
 - If the caliper does not slide freely: Remove the caliper from the carrier. Refer to Section 4. Check the guide pins and caliper guide pin bores for damage, corrosion or wear. Replace components as necessary.
- Replace the brake pads. If you reuse pads, reinstall them to their original positions.
- Inspect the guide pin and tappet dust covers for wear, corrosion or damage. Repair or replace components as necessary.
 - If a dust cover is loose or damaged:
 Disassemble the brake area and examine the components for damage. Repair or replace components as necessary.
- Check the brake rotor for grooving, cracking or corrosion.
- Check the rotor's thickness. Check the manufacturer's specification, which is cast in the rotor; or 1.61-inches (41 mm), whichever is larger. Replace as necessary.

Pad and Spreader Plate

- Check the guide pins and tappet dust covers for damage. Ensure that the pins and dust covers are secure.
- Check that the caliper housing slides freely on the guide pins.
- 3. Examine the spreader plate for wear or damage.
- Check the rotor for grooves, cracks, heat checks, scoring and bluing.
- Check the rotor's thickness dimension.
 The specification is cast in the rotor, or
 1.61-inches (41 mm), whichever is larger.
 - If the rotor's thickness dimension is not high enough to permit expected wear before the next brake pad replacement: Replace the rotor.



Section 8 Maintenance and Inspection

NOTE: One way to remove corrosion is to support a screwdriver or scraper on the caliper body and rotate the rotor.

 Remove scale, dirt and corrosion from the pad opening edges on the caliper, around the edge of the rotor and the spreader plate opening edges. Use an emery cloth if necessary.

Rotor

Check that the rotor's thickness dimension meets the manufacturer's specification. The specification is cast in the rotor or 1.61-inches (41 mm), whichever is larger. Inspect both rotor surfaces for the following conditions.

Cracks

Cracks extend through a section of the rotor. Braking under normal operating conditions can cause cracks to separate and deepen, and increase lining wear. Replace the rotor. **Figure 8.1**.

Heat Checking

Heat checking is fine cracks on the rotor's surface. This is a normal condition that results from continuous heating and cooling of the friction surface. There are two types of heat checking: light and heavy.

Light Heat Checking

Light heat checking is fine, tight cracks in the rotor's surface. You can continue to use a rotor with light heat checking. **Figure 8.2**.

Heavy Heat Checking

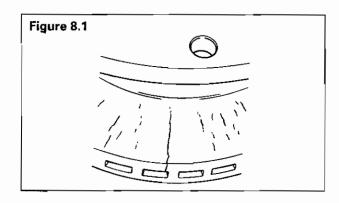
Heavy heat checking is cracks in the rotor's surface that are two inches or more and usually deep. Replace or refinish a rotor with heavy heat checking.

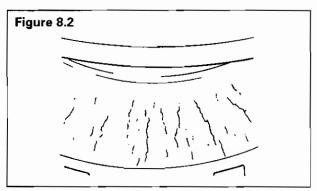
Scoring

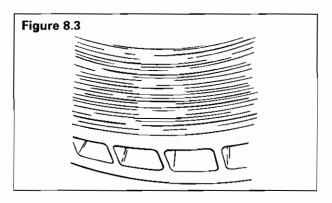
Scoring is deep grooves that can occur on both sides of the rotor's surface. If scoring is two inches or more, install a new lining and refinish the rotor. If the rotor's thickness is less than 1.614-inch (41 mm), replace the rotor. **Figure 8.3**.

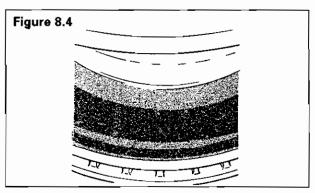
"Blue" Rotor

Blue marks or bands on the rotor indicate that extremely high temperatures occurred during operation. Refer to the "Troubleshooting" table in Section 9. Figure 8.4.











Section 9 Troubleshooting



Co	ndition	Possible Cause	What to Check For:	Corrective Action
1.	Poor Stopping Power	The air system does not operate correctly.	Correct air pressure at the chamber inlet	Qualified brake system specialist should evaluate the air system.
	 Increased 	The brakes are out of	Correct stroke	Adjust to recommended stroke.
	stopping distances • Poor driver feel	adjustment.	Correct installation (use automatic slack adjuster)	Correct the installation. Verify with slack adjuster template.
	High brake		Correct jam nut torque	Tighten the jam nut as required.
	pressures		Clevis and pawl for wear	Repair or replace worn parts as required.
		The vehicle is overloaded.	Gross Axle Weight Rating (GAWR) limitations on the vehicle ID plate	Follow the vehicle manufacturer's load recommendations.
		The linings are contaminated.	Oil, grease, etc., on linings	Replace linings.
		Companion brakes do not operate correctly.	Brakes and air system	Adjust or repair as required.
2.	Brake Does Not Operate Correctly	Refer to 1.	Refer to 1.	Refer to 1.
	Lack of normal response			
3.	Vehicle Pulls to One Side When Stopping	Refer to 1 and 2.	Refer to 1 and 2.	Refer to 1 and 2.
4.	Brake Drag	Incorrect manual adjustment	Automatic slack adjuster setup	Correct slack adjuster setup. Adjust to recommended stroke and
	Evidence of severe heat	aujustinoit	Correct pad-to-rotor running clearance	running clearance. Verify with slack adjuster template.
	 Rapid lining wear Blue discoloration of rotor braking surface 	The air system does not operate correctly.	Correct operation of quick release valve and relay valve	Repair or replace parts as required.
	Torn or charred piston/caliper	The brakes do not release.	Vehicle's air system is leaking	Find the leak and repair as required.
	boot seal		Brake chamber operates correctly	Repair or replace chamber as required.
			Emergency air pressure builds up slowly	Wait for full emergency air pressure buildup before operating the vehicle.
		There is excessive grease pressure in the caliper.	Incorrect Iubrication procedures	Follow lubrication recommendations.
		The caliper assembly is corroded internally.	Piston boot and caliper seal damage	Replace seals as required. Inspect and overhaul the caliper assembly as required.
5.	Short Outboard Lining Life	The caliper seized on the slide pins.	Excessive paint or other substance buildup on caliper slide pins or	Remove both slide pins. Clean, inspect and replace pins and bushings as required.
	Brake drag		bushings	





Section 9 Troubleshooting

Co	ondition	Possible Cause	What to Check For:	Corrective Action	
6.	Short Lining Life	Refer to 4 and 5.	Refer to 4 and 5.	Refer to 4 and 5.	
		Abusive operation of brake system	Driver technique	Train driver	
		The vehicle is overloaded.	Gross Axle Weight Rating (GAWR) limitations on the vehicle ID plate	Follow the vehicle manufacturer's load recommendations.	
		Companion brakes do not operate correctly.	Brakes and air system	Adjust or repair as required.	
7.	Pad Backing Plate Tab Wear	The pad tab area is brinnelled.	Brinnelling and back-and-forth movement of the pad in the caliper	Remove and replace the pads. Check the anti-rattle clip. If wear is excessive, replace the caliper assembly.	
8.	Rotor is Cracked or	Refer to 4, 5 and 6.	Minimum thickness	Replace the rotor, shoes and linings	
	Broken Lining wear and the caliper's position or slide pins were not checked during rout maintenance.		1.61-inches (41 mm) on rotor	as required. Review correct maintenance procedures.	
9.	Slide Pins and Retainer Pin Assemblies Difficult to Remove	Vehicle is operated in a highly-corrosive	Corrosion	Inspect slide pins and retainer pin assemblies. Replace as required.	
		environment.		Apply anti-seize compound to the retainer, but not the threads.	
				Seal the inner end of the lower slide pin retainer hole in the torque plate.	
10	. Smoking Brakes	The hub or wheel seal leaks.	Condition of seals	Replace as required. Clean the rotor as required.	
				Inspect the pads for oil and grease contamination. If oil or grease are evident, replace the pads.	
		The caliper sealing components leak.	Condition of piston boot, piston cap seal and piston/caliper seal	Replace as required.	
		The piston boot is out of the piston seating groove.	Excessive caliper lubrication, Incorrect piston boot position.	Follow lubrication recommendations. Replace the piston boot, if necessary.	
		There is paint on the slide pins and brakes.	All painted surfaces	Clean the slide pins and the brakes as required.	
		The vehicle was operated under high brake temperatures.	Refer to 1, 4, 5 and 6.	Refer to 1, 4, 5 and 6.	



Section 10 Specifications



How to Calculate Torque When You Use a Torque Adaptor

If an adaptor is attached to the square drive of a torquometer or a click-type torque wrench, and the extension adds length to the tool, the applied torque will be greater than the dial reading or preset torque.

You can use the following formula to determine what the dial should read or what the preset torque must be to obtain the correct applied torque.

Factors

RS	Torque wrench dial reading or torque setting.
Α	Distance from the center of the square drive of the torquometer or torque wrench to the center of the handle grip.
В	Length of the adaptor from the center of the square drive to the center of the nut or bolt. Use only the length that is parallel to the handle.
Т	Torque required — the actual torque applied to the fastener.

Formula

Dial Reading or Preset Torque =

Torque Wrench Length x Torque Required
Torque Wrench Length + Adaptor Length

OR

$$RS = \frac{A \times T}{\Delta + B}$$



Sample Problem

What should the dial read or the setting be when the values are as follows?

A = 12 inches

B = 6 inches

T = 30 lb-ft

Calculate Torque (Lb-Ft)

RS =
$$\frac{A \times T}{A + B}$$
 or $\frac{12 \times 30}{12 + 6}$ or $\frac{360}{18}$ = 20 lb-ft

Therefore, 30 lb-ft of torque will be applied at the fastener when RS is 20 lb-ft.

NOTE: If the torquometer or torque wrench reads in lb-ft, then T should be lb-ft, because T and RS must use the same unit of measurement (lb-ft). A and B must also use the same unit of measurement.

Torque Wrench Length (inches)	Adaptor Length (inches)	Required Torque Value (Lb-Ft)	Dial Reading to Obtain Required Torque Value (Lb-Ft)	
17.50	6.0	350-400	261-298	
37.75	6.0	350-400	302-345	



Service Tools

Description	Tool No.
Kent-Moore Service Kit*	J-34064-B
Meritor Template	TP-4789
Spring Retainer Adaptor	J-33860
Boot Adaptor	J-33862-1
Bearing and Nut Assembly	J-33862-2
Bushing Plug Cage	J-34064-53
Bushing Pin Cage	J-34064-54
Bushing Reamer	J-38388
Snap Ring Pliers (45°)	

^{*} Available from Kent-Moore, Heavy Duty Division, 28635 Mound Road, Warren, Michigan, 48092.

Grease Specifications

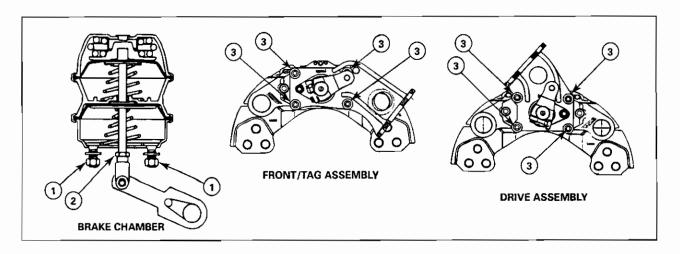
Component	Meritor Specification	NLGI Grade	Grease Description	Outside Temperature
Caliper*	O-645	2	Synthetic Oil, Clay Base	Down to -65°F (-54°C)
Automatic Slack	O-692	1 and 2	Lithium Base	Down to -40°F (-40°C)
Adjuster	O-645	2	Synthetic Oil, Clay Base	Down to -65°F (-54°C)

^{*} The grease used inside the caliper must be non-melting and also allow proper brake function at cold temperatures listed.

Torque

Brake Chamber Torque Values

			Torque Value Range	
Item	Description	Size	Lb-Ft	N∙m
1	Brake chamber mounting nuts	0.0625" - 11	100-115	135-155
2	Push rod lock nut	0.0625" - 18	25-50	35-68
3	Air chamber bracket bolts (4)	M12 x 50	80-100	108-132







ArvinMeritor Commercial Vehicle Systems

Meritor Heavy Vehicle Systems, LLC 2135 West Maple Road Troy, MI 48084 USA 800-535-5560

arvinmeritor.com

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Printed in the USA

Maintenance Manual MM-99108 Issued 05-00 16579/ArvinMeritor

